HDP/SB/21 based on PTO/SB/21 (08-00)

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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	**09/743,634**
Filing Date	March 16, 2001
Inventor(s)	Hans-Peter BURVENICH et al.
Group Art Unit	2125
Examiner Name	M.D. Masinick
Attorney Docket Number	32860-000115/US

ENCLOSURES *(check all that apply)*

- ☒ Fee Transmittal Form
  - ☒ Fee Attached
- ☐ Amendment
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Response to Missing Parts/ Incomplete Application
- ☐ Response to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Assignment Papers *(for an Application)*
- ☐ Letter to the Official Draftsperson and _____ Sheets of Formal Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
- ☐ After Allowance Communication to Group
- ☒ APPEAL BRIEF (in triplicate) (w/clean version of pending claims)
- ☐ Appeal Communication to Group *(Notice of Appeal, Brief, Reply Brief)*
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) *(please identify below)*:

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Harness, Dickey & Pierce, P.L.C.	Attorney Name Ray Heflin	Reg. No. 41,060
Signature			
Date	August 9, 2004		

AF/2125

PTO/SB/17 (10-03)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

IFW

FEE TRANSMITTAL for FY 2004

Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 330

Complete if Known	
Application Number	09/743,634
Filing Date	March 16, 2001
First Named Inventor	Hans-Peter BURVENICH
Examiner Name	M.D. Masinick
Art Unit	2125
Attorney Docket No.	32860-000115/US

METHOD OF PAYMENT (check all that apply)

☒ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☐ Deposit Account:

Deposit Account Number: 08-0750

Deposit Account Name: Harness, Dickey & Pierce, P.L.C.

The Director is authorized to: *(check all that apply)*
☐ Charge fee(s) indicated below ☒ Credit any overpayments
☒ Charge any additional fee(s) during the pendency of this application
☐ Charge fee(s) indicated below, **except for the filing fee** to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filling fee	

SUBTOTAL (1) ($) 0

2. EXTRA CLAIM FEES

			Extra Claims		Fee from below		Fee Paid
Total Claims		-20 **	= 0	X		=	0
Independent Claims		-3 **	= 0	X		=	0
Multiple Dependent				X		=	0

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 0

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	330
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive – unavoidable	
1453	1,330	2453	665	Petition to revive – unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17 (q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 330

SUBMITTED BY				Complete *(if applicable)*	
Name (Print/Type)	Ray Heflin	*Registration No. Attorney/Agent)*	41,060	*Telephone*	703-668-8000
Signature				*Date*	June 9, 2004

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

PATENT APPLICATION

IN THE U.S. PATENT AND TRADEMARK OFFICE

Appellants:	Hans-Peter BURVENICH et al.
Application No.:	09/743,634
Group Art Unit:	2125
Filed:	March 16, 2001
Examiner:	M.D. Masinick
For:	CONTINUOUS CASTING INSTALLATION, ESPECIALLY A THIN SLAB CONTINUOUS CASTING INSTALLATION
Attorney Docket No.	32860-000115/US

APPELLANTS' BRIEF ON APPEAL UNDER 37 C.F.R. § 1.192

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

August 9, 2004

Sir:

In accordance with the provisions of 37 C.F.R. § 1.192, Appellants submit the following:

I. REAL PARTY IN INTEREST:

The real parties in interest in this appeal are Siemens Aktiengesellschaft and Fraunhofer Gesellschaft Zur Förderung Der Angewandten Forschung E.V. Assignment of the application was submitted to the U.S. Patent and Trademark Office on March 16, 2001, and recorded on the same date at Reel 011594, Frame 0732.

II. RELATED APPEALS AND INTERFERENCES:

There are no known appeals or interferences that will affect, be directly affected by, or have a bearing on the Board's decision in this Appeal.

III. STATUS OF THE CLAIMS:

Claims 1, 2, 4-6, 8, 10, 11, 13, 15, 16, 18-23, and 26 are pending in the application, with claims 1 and 20 being written in independent form. Claims 1, 2, 4-6, 8, 10, 11, 13, 15, 16, 18-23, and 26 remain rejected under 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 5,808,891 to Lee et al. ("Lee") in view of U.S. Patent No. 5,222,192 to Shaefer ("Shaefer"), and further in view of U.S. Patent No. 5,404,516 to Georgiades et al. ("Georgiades").

All of the claims are set forth in the attached Appendix.

IV. STATUS OF AMENDMENTS:

No amendments were requested subsequent to the final rejection in the Office Action dated March 10, 2004.

V. SUMMARY OF THE INVENTION:

The present invention relates to a method of operating a continuous casting and rolling plant.[1] Fig. 3 schematically illustrates an exemplary embodiment.[2] Initially, a computing unit (at block 22) determines a starting solution indicating an order of slabs that could be produced in succession to fill production orders.[3] The starting solution is then evaluated (at block 23) via

[1] Spec., p. 3, l. 6-9.

[2] Spec., p. 11, l. 12-15.

[3] Spec., p. 12, l. 15-24.

an event-oriented evaluation.[4] The evaluation involves simulating the operation of the continuous casting and rolling plant using the values of the starting solution.[5] That is, the events that would occur during an actual operation of the plant (based on the starting solution) are simulated to obtain simulation results.[6] The simulation results are evaluated (at block 24) based on a number of criteria.[7]

If the simulation results are not acceptable, then the method is continued and a genetic algorithm is applied to the individual values of the starting solution.[8] The application of the genetic algorithm produces a new solution.[9] The new solution is evaluated (at block 23) using the same simulation technique discussed above.[10] That is, the events that would occur during an actual operation of the plant (based on the new solution) are simulated to obtain simulation results. The simulation results are evaluated (at block 24) based on a number of criteria.

VI. ISSUE:

The sole issue in this case is whether the Examiner's rejection of independent claims 1 and 20 under 35 U.S.C. §103(a) as being obvious over Lee in view of Shaefer, and further in view of Georgiades is proper.

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[4] Spec., p. 13, l. 4-7.

[5] Spec., p. 13, l. 7-11.

[6] Spec., p. 13, l. 25-30.

[7] Spec., p. 14, l. 12 – p. 15, l. 12.

[8] Spec., p. 15, l. 18 – p. 16, l. 10.

[9] Spec., p. 17, l. 8-10.

[10] Spec., p. 17, l. 10-11.

VII. GROUPING OF CLAIMS:

The claims of the present application may be considered in a single group that stand or fall together.

VIII. ARGUMENTS:

Independent claims 1 and 20 recite (albeit in slightly different formats) the following two features:

> (1) determining a solution for controlling a continuous casting and rolling plant using "*a genetic algorithm*;" and
>
> (2) evaluating the solution by "*simulating the operation of the continuous casting and rolling plant.*"

These features (as recited in independent claims 1 and 20), in combination with the other features defined by claims 1 and 20, are not taught or suggested by the prior art relied upon by the Examiner.

To reject claims 1 and 20, the Examiner relies upon the primary reference to Lee to teach a continuous casting and rolling plant in which a computing unit determines a schedule indicating the order of slabs to be produced.[11] The Examiner recognizes that Lee does not teach the "genetic algorithm" and "simulation" features defined by claims 1 and 20, and therefore looks to the secondary references of Shaefer and Georgiades to allegedly teach these features.[12] In so doing, the Examiner attempts to rely upon a modification of Lee that involves dispensing with the scheduling technique disclosed by Lee in favor of a genetic algorithm disclosed by Shaefer and

[11] March 10, 2004 Office Action, p. 4, paragraph 3.

[12] March 10, 2004 Office Action, p. 4-5, paragraphs 4-6.

Georgiades.[13] This rejection position should be reversed for the following reasons.

A. The Articulated Motivation is in Error:

According to the Examiner, those skilled in the art would have been motivated to implement the alleged substitution of scheduling techniques because genetic algorithms provide "extraordinarily quick discovery of early approximate solutions," and because "scheduling using genetic algorithms in scheduling and management environments is well known."[14] The Examiner also reasons that it would have been obvious to those skilled in the art looking for a better way to do scheduling in "ANY application" to turn to genetic algorithms.[15] Appellants disagree.

It is well settled that the Examiner bears the initial burden of factually supporting a prima facie case of obviousness. Such factual support includes pointing out some motivation, suggestion or teaching of the desirability of making the specific combination. The Examiner apparently believes that the genetic algorithms of the secondary references would somehow outperform (or improve upon) the scheduling technique disclosed by Lee. However, the Examiner has not indicated (with specificity) how the performance would be improved, and more importantly whether such improvement would be a desirable characteristic in the first place.

For example, the Examiner's remarks appear to intimate a belief that the alleged modification (if implemented) would somehow allow a solution (or schedule) to be obtained more quickly since genetic algorithms provide

[13] March 10, 2004 Office Action, p. 5, paragraph 7.

[14] March 10, 2004 Office Action, p. 5, paragraph 7.

[15] March 10, 2004 Office Action, p. 2 (first full paragraph).

"extraordinarily quick" solutions. This is simply not understood, however, because Lee is not at all concerned with generating a schedule quickly. Indeed, Lee lists several express objectives that include avoiding the violation of constraints and maximizing various production criteria.[16] None of the listed objectives are even remotely related to obtaining a solution quickly. Lee provides no indication that time is of the essences.

Furthermore, recent Federal Circuit case law holds that the suggestion to modify/combine the prior art must be "clear and particular."[17] In the situation at hand, however, the articulated motivation is overly broad. This is because none of the asserted references teaches that a genetic algorithm may be used in conjunction with a continuous rolling and casting plant. And without such a teaching, the alleged combination appears to be based on an impermissible hindsight of the present application.

Appellants acknowledge that the secondary references implement genetic algorithms in some unique applications. For example, Shaefer provides an extensive laundry list of practical applications inclusive of the selection of routes for packets switched over networks, the selection of successive legs of airline routes, the control of the paths of laser cutters used to create integrated circuits, detecting homologies in the human genome, and determining the best function in a class of functions for performing image compression.[18] And Georgiades teaches that a genetic algorithm may be used to generate asset schedules in time critical (e.g., military) applications.[19] But neither reference

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[16] Lee, col. 3, l. 61 – col. 4, l. 11.

[17] *Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1348 (Fed. Cir. 2000).

[18] Lee, col. 29, l. 13-25.

[19] Georgiades, col. 1, l. 7-11.

teaches or suggests that a genetic algorithm may be used in a continuous rolling and casting plant.

The only suggestion for combining a genetic algorithm and a continuous rolling and casting plant stems from hindsight knowledge derived from the present disclosure. In this regard, the rejection grounds seem to incorrectly dissect the claims into discrete components and then apply individual pieces of prior art. That is the hallmark of hindsight and not the characteristics of obviousness.

B. The Prior Art (taken alone or in combination) is not Pertinent to the Claimed "Evaluating" Feature:

None of the asserted references teaches or suggests that a solution from the genetic algorithm is evaluated via simulation, much less "by simulating the operation of the continuous casting and rolling plant," as required by independent claims 1 and 20.

As an initial matter, the rejection position appears to be internally inconsistent. On the one hand, the Examiner indicates that Georgiades' final evaluation processor 126 (see Fig. 1) provides the claimed "evaluating" feature (which includes simulation).[20] On the other hand, the Examiner seems to rely on Lee to teach an evaluation that involves simulation.[21] Notwithstanding, Appellants submit that none of the prior art is pertinent to the claimed "evaluating" feature.

Appellants acknowledge that both secondary references to Shaefer and Georgiades disclose that solutions may be evaluated. However, neither reference indicates that they may be evaluated via simulation. Consider

[20] March 10, 2004 Office Action, p. 5, paragraph 7.

[21] March 10, 2004 Office Action, p. 7, paragraph 20.

Shaefer. This reference merely indicates that an "analysis of the quality of the estimated solutions" is carried out based on information such as statistical properties.[22] Shaefer's disclosure in this regard is far too abstract to teach the specific "evaluation" technique defined by claims 1 and 20. And with respect to Georgiades, the exact portion of the reference cited by the Examiner merely indicates that the final evaluation processor 126 utilizes the "problem objectives" to evaluate the fitness of the of the selected combinations of asset schedules.[23] But it does not mention any simulation feature.

Turning to the primary reference, the Examiner alleges that Lee teaches an evaluation feature that involves simulation.[24] Interestingly, the Examiner does not cite any specific portion of Lee to support the allegation. The Examiner does not do so because Lee does not indicate that a solution (or schedule) is evaluated via simulation. The Examiner's assertions to the contrary are simply incorrect.

Appellants submit that none of the other references (i.e., U.S. Patent No. 5,745,361 to Kim et al., and U.S. Patent No. 5,930,780 to Hughes et al.) cited but not applied, make up for the deficiencies of applied references discussed above.

IV. CONCLUSION:

In summary, those skilled in the art would not have been motivated to combine the references in the manner suggested by the Examiner. Furthermore, the prior art references (whether taken alone or in combination) do not teach or suggest evaluating a solution from a genetic algorithm by

[22] Shaefer, col. 8, l. 60-68.

[23] Georgiades, col. 5, l. 56 – col. 6, l. 14.

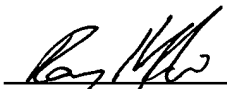
[24] March 10, 2004 Office Action, p. 7, paragraph 20.

simulating the operation of the continuous casting and rolling plant. Consequently, even if combined in the manner suggested by the Examiner, the prior art would still not meet all of the limitations of independent claims 1 and 20. Accordingly, the prior art rejection should be reversed and all of the claims passed to issue.

This Appeal Brief is presented in triplicate. The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

HARNESS, DICKEY, & PIERCE, P.L.C.

By 

Ray Heflin, Reg. No. 41,060
P.O. Box 8910
Reston, Virginia 20195
(703) 668-8000

DJD/HRH

APPENDIX

Claims 1, 2, 4-6, 8, 10, 11, 13, 15, 16, 18-23, and 26 on Appeal:

1. A method of operating a continuous casting and rolling plant with a computing unit, including a plurality of slabs belonging to different production orders within sequences on the continuous casting and rolling plant, comprising:

determining a solution indicating the order of the slabs belonging to the production orders within the sequences with the computing unit by a genetic algorithm;

evaluating the solution by an event-oriented evaluation, wherein the event-oriented evaluation is carried out by simulating the operation of the continuous casting and rolling plant; and

controlling the continuous casting and rolling plant by the computing unit in accordance with the solution.

2. The method as claimed in claim 1, wherein at least one of a selection, a recombination and a mutation is carried out by the genetic algorithm.

4. The method as claimed in claim 1, wherein the solution is evaluated according to quality by the event-oriented evaluation.

5. The method as claimed in claim 1, wherein a starting solution, as a starting point, is determined by the computing unit.

6. A continuous casting and rolling plant with a computing unit and means for carrying out the method as claimed in claim 1, wherein a plurality of slabs which belong to different production orders are produced within sequences on the continuous casting and rolling plant, wherein the computing unit contains a genetic algorithm for determining the order of the slabs belonging to the production orders within the sequences.

8. The method of claim 1, wherein the continuous casting and rolling plant is a thin-slab continuous casting and rolling plant.

10. The method as claimed in claim 2, wherein the solution is evaluated according to quality by the event-oriented evaluation.

11. The method as claimed claim 2, wherein a starting solution, as a starting point, is determined by the computing unit.

13. The method as claimed claim 4, wherein a starting solution, as a starting point, is determined by the computing unit.

15. The method as claimed claim 10, wherein a starting solution, as a starting point, is determined by the computing unit.

16. A continuous casting and rolling plant with a computing unit and means for carrying out the method as claimed in claim 2, wherein a plurality of slabs which belong to different production orders are produced within sequences on the continuous casting and rolling plant, wherein the computing

unit contains a genetic algorithm for determining the order of the slabs belonging to the production orders within the sequences.

18. A continuous casting and rolling plant with a computing unit and means for carrying out the method as claimed in claim 4, wherein a plurality of slabs which belong to different production orders are produced within sequences on the continuous casting and rolling plant, wherein the computing unit contains a genetic algorithm for determining the order of the slabs belonging to the production orders within the sequences.

19. A continuous casting and rolling plant with a computing unit and means for carrying out the method as claimed in claim 5, wherein a plurality of slabs which belong to different production orders are produced within sequences on the continuous casting and rolling plant, wherein the computing unit contains a genetic algorithm for determining the order of the slabs belonging to the production orders within the sequences.

20. A method of operating a plant, comprising:

using a genetic algorithm to determine a solution to operate a continuous casting and rolling plant in a substantially optimum manner; and

evaluating the solution by an event-oriented evaluation, wherein the event-oriented evaluation is carried out by simulating the operation of the continuous casting and rolling plant.

21. The method according to claim 1, further comprising determining an initial solution for determining an iteration process for operating the continuous casting and rolling plant.

22. The method according to claim 1, further comprising determining a solution space defining data usable for operating the continuous casting and rolling plant.

23. The method according to claim 22, wherein the data pertains to at least one of delivery dates, quantities to be delivered and order-related restrictions.

26. The method according to claim 1, wherein technical characteristics of the continuous casting and rolling plant are evaluated during the simulating step, the technical characteristics including at least one of a number of casting strands, a number and type of continuous caster, a number of slab strands passed through a furnace, and a number and type of rolls in a mill.